

Preface

E-business, which encompasses such activities as buying and selling products and services and serving customers and collaborating with business partners on the Internet, continues to evolve and expand to handle an increasing number of business transactions. For an e-business to be successful, it must use sound business practices and have a strong and flexible infrastructure. The technologies on which the infrastructure is based continue to grow and produce more refined capabilities. The Java** programming language, Extensible Markup Language (XML), and transcoding are three technologies currently contributing to building the e-business infrastructure.

In this issue, an overview essay and ten papers focus on ways in which these technologies are being used to enhance the e-business environment. Among the contributions are papers describing products based on these technologies, security considerations, and methodologies. This issue also contains a paper on metrics for software testing. We are indebted to K. D. Gottschalk of the IBM Software Group in Research Triangle Park, North Carolina for his initiative and effort in obtaining and coordinating the theme papers in this issue.

As the technologies supporting e-business emerge, they tend to follow trends set by what is being used for business transactions. In an overview essay, Smith discusses four major trends involving the Java programming language, XML, transcoding technologies, and the move from tightly coupled applications to loosely coupled Web services.

The Application Framework for e-business is an IBM strategic initiative. Flurry and Vicknair describe how the Framework addresses the requirements of e-business with a set of open standards, services, and prod-

ucts. They discuss how the Framework defines a system model, an application programming model, and a platform that combine to provide an approach to developing and deploying e-business applications.

The WebSphere* product family is a key contribution in IBM's efforts to provide solutions for customers who want to set up an e-business. Ferguson and Kerth describe the WebSphere Application Servers and several related products that support the infrastructure for e-business. In business-to-consumer scenarios and business-to-business scenarios, the authors discuss how these products are used.

The Customer Information Control System (CICS*) has been used for over 30 years to handle transactions for many businesses. Building on its role as an application server, CICS has been updated to be a high-end server in the e-business environment. Bainbridge et al. describe how the Enterprise JavaBeans** component of Java technology has been integrated into CICS. They further describe how this capability handles transaction and workload management.

Electronic interactions between businesses are defined by trading-partner agreements. Dan et al. describe middleware technology developed by IBM Research for integrating these interactions. They discuss the principles involved and an XML-based language that they developed for expressing the agreements. They also describe a framework of tools and services for supporting interactions based on the trading-partner agreements.

The IBM WebSphere Commerce Suite is a software product that enables the development of dynamic, secure, on-line businesses. Product Advisor, a com-

ponent of the WebSphere Commerce Suite, consists of a set of tools to be used by marketing personnel to generate, without programming help, Web shopping applications involving a product catalog. Rofrano describes the shopping paradigms covered by Product Advisor, as well as the Java infrastructure that supports the Product Advisor tools.

In enterprise environments, e-business applications may need to be controlled and managed by external management systems. Kreger discusses the Java Management Extensions (JMX**), a package extending the Java language that provides a means to manage applications based on Java technology. JMX benefits vendors targeting enterprise environments by insulating application developers from the need to anticipate which management systems their customers will use.

Security is an important requirement for e-business. With the use of Java technology, Web application servers have become a major means of providing e-business environments. Koved et al. survey the various Java security technologies that can be employed between client and server entities, and from served objects, to make Web application server environments secure.

As e-business becomes widespread, it encompasses devices with limited display capabilities. Britton et al. describe how transcoding technology is being used to adapt the content developed for large displays to fit the constraints of various small devices. They discuss different approaches to content adaptation and where best to perform transcoding.

Information on the Web cannot always be stored in a format that anticipates all its possible uses. Data are converted from one format into another by transcoders, which are usually implemented as stand-alone components. Ihde et al. describe a more flexible approach by suggesting a framework for creating a set of modular transcoding units that can be composed as needed. They also outline a formal mechanism intended to simplify the problem of composing transcoding operations.

Hild et al. focus on the impact that the emerging pervasive "sea of devices" is having on the Web infrastructure and, in particular, application hosting. They describe Whale, an architecture based on the WebSphere Application Server, which enables an application to optimally interact with each device. The first commercial deployment of the architecture, a

wireless application in the airline industry, is also described.

In a paper separate from the theme of this issue, Kan, Parrish, and Manlove describe the value and significance of using in-process metrics for the testing phase of software development. The metrics described were implemented at the IBM AS/400* software development laboratory. The authors indicate that it is the effectiveness of the metrics that matters and not the number of metrics applied in testing.

As the *Journal* begins its 40th year, we are grateful for the support of our readers, authors, and referees, and we look forward to your continued interest and participation. Because we are mindful of your support, we would like you to know that we strive to maintain the highest standards for a refereed technical journal by ensuring the integrity of each paper through a process of peer review by experts within and outside IBM. Since the *Journal* is intended for software and systems professionals and the applied research community worldwide, the papers are written for technically aware readers.

The next issue of the *Journal* will be on "deep" computing in the life sciences. The papers fall into three broad areas: computational modeling and numerically intensive computing, data management and integration, and algorithms for data mining and analysis.

Alfred G. Davis
Associate Editor

John J. Ritsko
Editor-in-Chief

*Trademark or registered trademark of International Business Machines Corporation.

**Trademark or registered trademark of Sun Microsystems, Inc.